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Versatile Home Design

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Abstract

The development of technology has made remote access quite easily. Smart home automation is very popular nowadays in order to enable people to live comfortably, peacefully and happily. To facilitate of human life, many systems such as electrical household appliances, lighting, garden irrigation, doors used in homes are controlled manually. In addition to these, home security will be provided by taking precautions against the hazards that many occur at home. It is aimed to control the household appliances used here from a single center. The heating of the house is important for the environment. Room temperature is between 16-18 C for bedrooms and 19-21 C for living rooms. A 1-degree reduction in ambient temperature during winter can save up to 5-7% on fuel consumption. When the amount of moisture is in the 50-55% range, the thermal balance is at the optimum level and energy saving is achieved. In addition, it is targeted to use rainwater in the cleaning and garden watering. Additionally, 20% of the electricity used in houses is used for lighting. In our intelligent automation system, rain sensors will be installed underneath the machines in order to be able to detect possible water leaks in devices that need water and will give audible and illuminated warning in the event of possible leakage. Remote control of the system will be provided via Bluetooth over an application over the phone. Electricity will be generated by the solar panels by taking advantage of the daylight of the system, which aims at energy saving. Amount of energy is stored to the battery in the night for garden and the front door lighting. According to the work published by the World Energy Council; Electricity can be generated from wind power in areas with wind velocities above 5.1 m/s. The intelligent system will be a messenger of dangerous events that can occur as it facilitates the use of home devices. The aim of the system is to save energy and to facilitate human life by means of a streamlined home.

Keywords: Smart Home, Automation

Akıllı Ev Tasarımı

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Özet

Teknolojinin gelişimi, uzaktan erişimi oldukça kolaylaştırdı. Akıllı ev otomasyonu günümüzde insanların rahat, huzurlu ve mutlu yaşayabilmeleri için çok popülerdir. İnsan hayatını kolaylaştırmak için elektrikli ev aletleri, aydınlatma, bahçe sulama, evlerde kullanılan kapılar gibi birçok sistem elle kontrol edilmektedir. Bunlara ek olarak, evde güvenlik, çoğu kişinin evde oluşabilecek tehlikelere karşı önlem alarak sağlanacaktır. Burada kullanılan ev aletlerini tek bir merkezden kontrol etmeyi amaçlıyoruz. Evin ısınması çevre için önemlidir. Oda sıcaklığı, yatak odaları için 16-18 C, oturma odaları için 19-21 C'dir. Kış aylarında ortam sıcaklıklarında 1 derecelik bir azalma yakıt tüketiminde% 5-7 tasarruf sağlayabilir. Nem miktarı% 50-55 aralığında olduğunda, termal denge en uygun seviyede bulunur ve enerji tasarrufu sağlanır. Ayrıca, temizlik ve bahçe sulamada yağmur

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suyu kullanılması hedefleniyor. Ayrıca, evlerde kullanılan elektriğin% 20'si aydınlatma için kullanılır. Akıllı otomasyon sistemimizde, suya ihtiyaç duyan cihazlarda olası su sızıntılarını tespit edebilmek için yağmur sensörleri makinelerin altına monte edilecek ve muhtemel kaçak durumunda sesli ve aydınlık bir uyarı verecektir. Sistemin uzaktan kumandası, Bluetooth üzerinden telefon üzerinden bir uygulama üzerinden sağlanacaktır. Elektrik, enerji tasarrufunu amaçlayan sistemin gün ışığından yararlanarak güneş panelleri tarafından üretilecek. Enerji miktarı, bahçede ve ön kapı aydınlatmasında geceleyin aküye depolanır. Dünya Enerji Konseyi tarafından yayınlanan çalışmaya göre; Elektrik 5.1 m / s'nin üzerindeki rüzgar hızındaki alanlarda rüzgar enerjisinden üretilebilir. Akıllı sistem, ev cihazlarının kullanımını kolaylaştırdığı için oluşabilecek tehlikeli olayların haberci olacak. Sistemin amacı, enerji tasarrufu yapmak ve aerodinamik bir ev vasıtasıyla insan hayatını kolaylaştırmaktır.

Anahtar Kelimeler :Akıllı Ev, Otomasyon

1. Introduction

Today, intelligent home systems are designs that provide comfortable, safe, easy and optimum energy usage and great convenience to the users. Remote access, multiple controllers, electricity and water saving control systems are the basis of smart home design. Thanks to multiple sensors and data from the environment, remote controlled structures have been created [1]. Remote control design units have been the most important work area of this work [2]. There are many microcontroller studies in which these sensors and remote control units are manipulated and guided [3]. Intelligent home designs are being implemented for energy saving as well as for remote control systems [4] [5]. In this study, remote sensing systems with many sensors were aimed at convenience. There are also important units in terms of home security with solar and wind energies and energy saving constructions.

2. Materials and Methods

Our design generally includes single point lighting control, heat and humidity control, gas and smoke control, water leakage control from laundry and dishwashers, scrambled door control, automatic garage door control and energy saving garden irrigation control.
All the sensors and control units connected to the Arduino Mega microcontroller perform all operations from a single center.

2.1.Gas Detector

Home security is provided by the MQ6 gas sensor, which allows the alarm system to be activated by detecting the smoke that may be generated from natural gas leaks or at home. In addition, residents are warned by activating the audible warning system.

Figure 1.Gas Detector Sensor

2.2. Water Leak Control

Rain sensors located under the laundry and dishwasher in the house are used to detect possible leaks and data is sent to the Arduino circuit board and an audible alarm is given in the direction of this data. In addition; the power of the mains water and the machine is cut off to remove the risks that may occur.

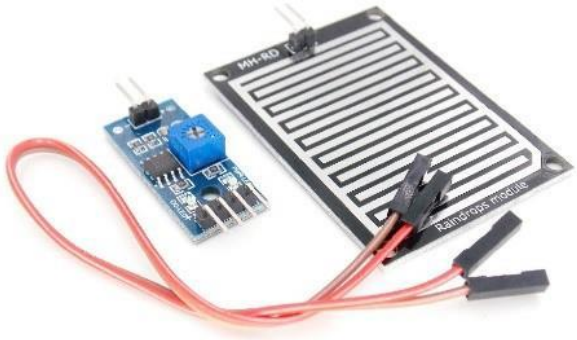

Figure 2.Rain Sensor

2.3. Lighting Control

The designed intelligent house prototype consists of 4 rooms and the lighting system of each room can be controlled both remotely and via the keypad with the HC-06 bluetooth module.

2.4. Automatic Garage Door Control

The garage inside the garden is remotely detected by the MZ-80 infrared sensor and automatically opens the garage door via the servo motor. The garage door can be controlled by keypad or bluetooth even in the garage.

Figure 2. Distance Sensor

2.5. Solar Panel Control

On days when the weather is sunny, the solar panels mounted on the smart house roof store the energy and charge the battery. In this way, both energy saving will be done and the system will continue to be energized in case of energy interruptions.

3. Results and Discussion

Designed in the literature, intelligent home projects are aimed at making life easier for people from energy saving. However, in this project, it was ensured that energy saving, prevention at home hazards and warning were given. As energy saving, it will be reused by reusing rainwater, utilizing solar energy and storing energy. All of these will be collected under one system. Thus, by the development of technology in the direction of the demands, it is expected that the reduction of the human power and the autonomous systems will make life easier and economical.

4. Conclusions

With intelligent home automation, time-controlled and centralized remote access system was aimed to facilitate human life. A conservative, safe and economical home is facilitated to manage and reduce the time and energy loss by 30-35%. It is aimed to be aware of the hazards in advance, to store and use rain water, to warn water leaks of water-working devices, to obtain hot water by heating the water from the electricity generated by solar panels, and to store the energy in front of the door and garden. Garden irrigation and outdoor lighting are provided using solar energy and wind energy, a renewable energy source in the home, which can lead to dangerous hazards in a home, unheeded energy losses and people saving time. It is also aimed to determine the danger that may occur in the house and to intervene immediately.

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